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This volume is dedicated to Dr. Rainer Zangerl

INTRODUCTION AND INDEX TO FIELDIANA: GEOLOGY VOLUME 33

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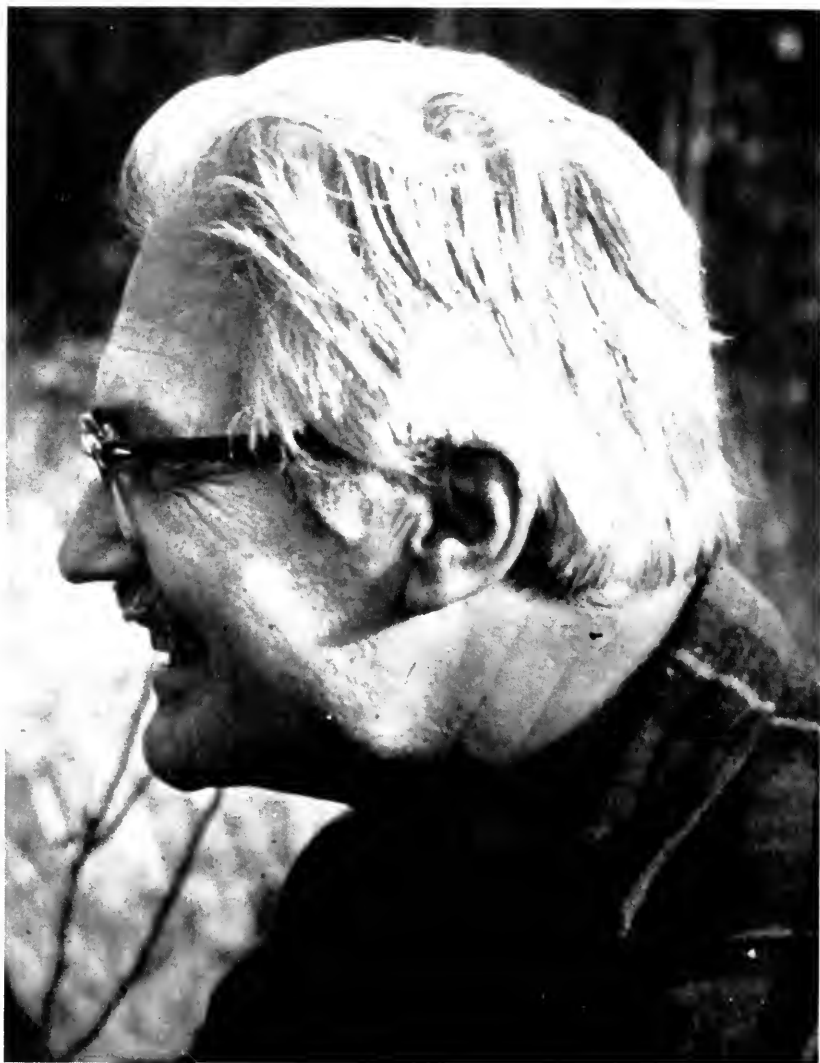
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Probably every author represented in this volume has a different appreciation of Rainer Zangerl. That this is so reflects not only the variation within the population of contributors, but also Rainer's own multifaceted nature. Many of us know him best as a field man; many know him for his expertise in the systematics of turtles and other squamose animals, or of wildly various chondrichthyans, or in dental histology, or evolutionary theory. Many of us know him as a man of strong opinions: his early perception of environmental concerns was not widely shared at a time when most people casually considered natural resources to be limitless and their squandering to be harmless. Some of us know him as teacher and mentor. A few of us know him in all of these capacities.

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RAINER ZANGERL

One cannot think of Rainer without thinking also of Anne, his wife. Many of us cherish the memory of evenings in their house in suburban Chicago, which Rainer designed, or in the much more elaborate home in Hajji Hollow, Indiana, which he also designed and which he and Anne built over a period of years. This *Festschrift*, though naming one in its dedication, is really dedicated to both. At home or in the field, they are a unit.

Rainer was born in Switzerland in the ancient town of Winterthur near Zurich and spent his boyhood summers in the Alps of Switzerland and in the Austrian Tyrol. If his house in Hajji Hollow has an Austrian look, it is because it owes something to the family's ancient summer retreat in the Paznaun Valley. If the front door seems to have come from a Viennese townhouse, it is because Rainer made it, paneled within panels of two-inch thick laminated oak, from plans in an old book on German carpentry. If the furnace is not recognizably standard American, it is because Rainer made it, with a great heat sink of five tons of brick and rock, on the model of the 16th-century central heating system in the Paznaun house.

As a boy in the summer of 1928, Rainer was sent to the upper Rhône Valley in French Switzerland to stay with the local priest and learn French. Things were not very lively, and so when one of the local boys was taken sick, Rainer volunteered to herd the cows to and from their nearly vertical meadows and to do the milking. Swiss cows, on account of their remarkable diet of wildflowers, yield a substance that approximates whipped cream. Extracting this delicious fluid from the cows, however, is a job for the horny-handed, and so Rainer duly developed calouses. At the end of the summer, he returned to Winterthur with hardened thumbs, a good coat of tan, and a practical knowledge of French, not to mention an understanding of how the inhabitants of the Rhône Valley made their renowned cheeses and wines. In contrast to this pastoral summer, he spent the winter of 1928-1929 perfecting his English at Highgate College, a typically spartan boarding school in London.

Rainer then entered the University of Zurich and there began the studies that would shape his professional future. Among his professors was Hans Schinz, a roentgenologist, whose course emphasized avian osteogenesis. Rainer absorbed the subject matter, but also took advantage of the professor's technicians to learn how to use the x-ray machines. He had fossils in mind, being determined to become a vertebrate paleontologist. His major professor was Bernhard Peyer, from whom he took vertebrate anatomy and paleontology. He served as Peyer's assistant in quarrying Triassic fossils

from a bituminous limestone in the Tessin in southern Switzerland, and it was there that he obtained the specimens of *Pachypleurosauros* on which he wrote his dissertation. Rainer received the Ph.D. degree from Zurich at the age of 23, the youngest up to that time on the University records.

Because there were no jobs in Switzerland for paleoherpetologists in 1935, Rainer sent bundles of résumés to far places. A belated response from a Zurich graduate in South Africa offered not a job, but advice: go to the United States. So off he set on a slow boat for New York. There he encountered Al Romer, who arranged an appointment for him at Harvard as guest researcher in comparative anatomy. Al also allowed Rainer to use his house in Cambridge for a term while he was away. With a job and a place to live, things were looking up, and so Rainer sent for his fiancée, Anne Kurz, in Winterthur, and they were married in Cambridge in 1937.

The guest position at Harvard ended with the spring of 1938, and it was necessary to find something more permanent. After seeing an announcement of Middlesex University, which was then expanding to include veterinary science, Rainer went to Waltham, Massachusetts, to discuss the matter with the proprietor, Dr. John Hall Smith, and the president, Dr. Ruggles Smith. At the close of an agreeable conversation, the faculty in veterinary science had been expanded from 0 to 1, and Rainer became not only professor, but head of the department, with a salary of \$125 per month. One of his first official acts was to appoint Anne as half-time instructor at a monthly salary of \$25. He and Anne then moved to Waltham.

At Middlesex University, Rainer found an outlet for another of his talents. In conversation with Dr. Smith, the proprietor, Rainer happened to mention that he had some knowledge of drafting, derived from his architect father. As a result, he received a \$30 architectural commission for designing a proper laboratory building for veterinary anatomy. The building was actually built after the Zangerls had left Middlesex. The basic edifice apparently still stands as a part of Brandeis University but extensively enlarged.

In 1939 Rainer and Anne moved to Detroit, where Rainer had accepted the position of instructor in zoology and comparative morphology at the University of Detroit. Although the University of Detroit was far better equipped than Middlesex, the budget was still tight, and in order to provide specimens for the anatomy classes, Rainer proposed going to Florida to collect dogfish and whatever else might turn up. He and Anne had a happy collecting season, the first of their many trips that have made them familiar

with large parts of this country. Their first paleontological collecting in the United States was also for Detroit. They collected in the Big Badlands, gathered Green River fishes in Wyoming, and crossed the mountains to the Uinta Basin for its Eocene vertebrate fossils.

Rainer left Detroit in 1942 for a position as assistant professor of comparative anatomy at Notre Dame, where he stayed for three terms. Then, on the recommendation of Karl P. Schmidt, Chief Curator of Zoology at Field Museum, he came to Chicago as Curator of Fossil Reptiles and Amphibians in the Department of Geology. Here, he found Paul McGrew and Bryan Patterson as stimulating colleagues. Dwight Davis, Clifford Pope, Robert Inger, Loren Woods, Rupert Wenzel, and Henry Dybas, all in the Department of Zoology, and Theodor Just in the Department of Botany also provided scientific interchange.

Rainer's career at the Museum included much field work. He made several trips to the Cretaceous chalk near Selma, Alabama, and from these trips came the fossil turtles on which he based five important Field Museum memoirs, as well as incidental fishes, dinosaurs, and mosasaurs for the collection, later monographed by others. Rainer became a world authority on fossil turtles, and at that period it seemed that they would occupy him for the rest of his career.

Probably to his own surprise, turtles were eventually eclipsed in Rainer's research by fishes. In conversation with Loren Woods, the Museum's ichthyologist, Rainer emphasized the importance of fossils in determining fish phylogeny. But how, wondered Loren, does one obtain fossil fishes? Well, Rainer went on, after one has been collecting fossils for many years, one develops a sense for what rocks may be fossiliferous. Loren was willing to be convinced and suggested a trip to Posey County, Indiana, where some Woods relatives had a coal mine with nice fresh rock exposed in the head-wall. Rainer did, indeed, locate a thin bed of black shale that looked promising, and when they dug into it, there were, indeed, fragments of fossil fishes.

On the way back to Chicago, as they were zooming along U.S. 41, on a hill near Mecca in Parke County, Indiana, Rainer noticed a likely looking rock along the roadside. They stopped to examine the rock, and found it was more than promising. Each piece of the Pennsylvanian black shale that they split revealed a fossil fish—articulated fossils of whole palaeoniscoid fishes or intact, though dismembered, parts of sharks. Rainer showed the new locality to Bob Denison, Bill Turnbull, and Gene Richardson from the Museum and

to Bernhard Peyer, who happened soon afterward to be visiting this country. They all found specimens in good number.

When other projects permitted, Rainer and Bill Turnbull went back to Parke County and located a likely spot for a quarry. By good fortune, the landowner happened to own a small bulldozer and was more than happy to dig a small quarry on the black shale. With the help of Gene and a succession of students, Rainer and Bill pried up the joint blocks from their Mecca Quarry and took them back to the Museum, where they were reassembled in a large laboratory. For two years the teams split and x-rayed the slabs of shale, charting every fossil fragment, with a running exchange of theory and countertheory regarding how such a dense concentration of fossil fishes could have come about. Field interludes were devoted to mapping the lateral extent of the occurrence, with its variations in fauna and lithology. In 1957 one of the new localities developed into Logan Quarry, much larger than Mecca Quarry, and the next year another became Garrard Quarry.

After numerous debates and a month in Louisiana studying fish decomposition in nature, Rainer and Gene presented their evidence in 1963 in a Field Museum memoir. Rainer followed this in 1973 with another memoir (with Gerard Case) describing the Iniopterygia, a new order of cartilaginous fishes from the Pennsylvanian black shales, and he has since completed a manuscript on their amazingly varied and important sharks.

In the midst of his work on black shale fish, Rainer undertook two very different projects. Dwight Davis, the Museum's distinguished comparative anatomist, asked him for help in deciphering the impenetrable German of a book on phylogenetic systematics by one Willi Hennig. They became interested in the principles that Hennig set forth. Presently they were spending their lunch hours together, and in a year or so produced a fluent translation which was published in 1966 by the University of Illinois Press. This book has been the introduction to cladistics for most English-speaking biologists. Rainer also translated from the German a text on dental histology by his old Zurich professor, Peyer, which was published in 1968 (unfortunately, after Peyer's death).

The Pennsylvanian black shales have been the most sustained of Rainer's many field projects for the Museum, following other programs in the Cretaceous of Alabama and Texas and in the Eocene and Triassic of Wyoming. But the lovely hardwood forests and the shale outcrops and wild gullies of the Mecca area in Parke County took a firm hold on Rainer's affection, and he bought a secluded

tract, a natural amphitheater with outcrops of fossiliferous black shale, where he has built his retirement home-and-laboratory, appropriately known as Hajji Hollow (a Hajji is, of course, one who has been to Mecca). "Retirement" is, however, a misnomer for Rainer's current activities. The work on Pennsylvanian black shale fossils is in fact ongoing to this day with undiminished vigor, as are such sidelines as wine-making and house design and construction. We join Rainer's many friends and associates in the hope and expectation that this happy state of multiple affairs will long continue.

AUTHOR INDEX

Adamec, Thomas	441
Bardack, David	355, 489
Bolles, Kathryn	271
Bolt, John R.	11
DeMar, Robert F.	339
Denison, Robert H.	31
Dunkle, David H.	205
Falk, Dean	423
Gaffney, Eugene S.	157
Hopson, James A.	83
†Johnson, Ralph G.	471
Langston, Wann, Jr.	291
Lund, Richard	521
McDonald, Nicholas G.	205
McGrew, Paul O.	257
Nitecki, Matthew H.	1
Olson, Everett C.	271
†Patterson, Bryan	397
Pfefferkorn, Hermann W.	315
†Quinn, James H.	511
Radinsky, Leonard	323
Reed, Charles A.	423
Richardson, Catherine K.	179
Richardson, Eugene S., Jr.	489
Rigby, J. Keith	1
Russell, Dale A.	235
Shaeffer, Bobb	205
Schram, Frederick R.	95
Schultze, Hans-Peter	375
†Segall, Walter	59
Shabica, Charles W.	541
Taylor, Katherine Elbaum	441
Thompson, Ida	471
Turnbull, Priscilla F.	141
Turnbull, William D.	569
Wilson, John Andrew	193
Woodland, Bertram G.	125, 179

SUBJECT INDEX

In this index, only the first page reference within a given paper is cited for any topic; readers should look on later pages for additional references. Names of stratigraphic units are bunched under the pertinent system entries. Subgenera are indexed as genera. Trivial names are not indexed except for *zangerli* and other new species, and citations of authors are not indexed except for Rainer Zangerl; this practice emphasizes the dedicatory nature of the volume.

This index was compiled with the help of Olive Turnbull.

- | | |
|-----------------------------------|------------------------------------|
| <i>Acadiocaris novascotica</i> 95 | <i>Androstachys frondosus</i> 320 |
| <i>Acheloma</i> 13 | <i>Ankelacephalon</i> 120 |
| <i>cumminsi</i> 13 | Annelida 471 |
| <i>pricei</i> 13 | Anthaspidellidae 9 |
| sp. 14 | <i>Anthracocaris scoticus</i> 106 |
| <i>whitei</i> 13 | Anticosti Island, Quebec |
| <i>Acrolepis</i> 224 | Ordovician sponges 1 |
| <i>Acropholis</i> 224 | <i>Araucarites spiniformis</i> 320 |
| <i>Adinotherium</i> 413 | <i>Archaeolithophyllum</i> 556 |
| <i>Agassizodus</i> 524 | <i>Archaeolophus</i> 397 |
| <i>Agnatha</i> 489 | <i>praecursor</i> 409 |
| Alabama | <i>Archaeoscyphia</i> 1 |
| Cretaceous mosasaur 240 | <i>annulata</i> 9 |
| <i>Allactaga</i> sp. 145 | <i>boltoni</i> 1 |
| <i>Alligator</i> | <i>minganensis</i> 9 |
| <i>mississippiensis</i> 302 | <i>Arctocyon</i> 323 |
| <i>Alloberyx</i> 363 | <i>primaevus</i> 326 |
| <i>Allosaccus</i> 9 | <i>Arctocyonides</i> 323 |
| <i>Ambystoma</i> 277 | <i>Arctostrea</i> 342 |
| Amphibia | <i>Arenicolites</i> 543 |
| <i>Ambystoma</i> 277 | Arkansas |
| Labyrinthodontia 11 | Cretaceous mosasaur 241 |
| Larval 395 | Mississippian cephalopod 511 |
| <i>Lysorophus</i> 271 | <i>Aulocopina</i> 9 |
| <i>Molgophis</i> 276 | <i>Aulocopium</i> 9 |
| <i>Peronedon</i> 283 | <i>Australopithecus</i> 423 |
| <i>Siren</i> 277 | <i>africanus</i> 424 |
| <i>Amphicyon</i> 330 | Austria, Triassic fish 207 |
| <i>Ancylocoelus frequens</i> 411 | |

- Bacteria
 activity 179, 260
 sulfate-reducing 131
 Baradostian 141
 Batagur 173
 Belgium
 Cretaceous mosasaur 241
Benthosuchus 25
Bergisuchus 291
Berycopsis 358
 Biostratigraphy 197
Biscalitheca 315
 musata 321
 Black shale
 Mississippian, Arkansas 511
 Pennsylvania, Illinois Basin 129,
 179, 441
boltoni, *Archaeoscyphia*, n. sp. 3
Boreolepis 224
Boreosomus 215
Bos primigenius 145
Brachipposideros 65
 Bradyodonti
 evolution 521
 tooth histology 523
 Brain
 condylarth 323
 notoungulate 416
 Bridgerian 574
Brittsia problematica 315
 Burrows, Permo-Carboniferous 271

Callianassa 288
Calycocoelia 9
Campodus 532
Canis lupus 145
Capra hircus aegagrus 145
Capra ovis, indet. 145
Caproberyx 363
 superbus 367
Carinodens fraasi 237
Carodnia 409
Carolozittelia 397
 "eluta" 409
 tapiroides 409
 Cephalopoda
 Mississippian *Rayonnoceras* 511
Ceratodus parvus 47
Cervus elaphus 145

 Chelonia, Chelydridae,
 phylogeny 157
Chelydra 157
 serpentina 164
Chilonatalis tumidifrons 73
 Chimaerid 531
Chinemys 173
Chirodipterus 32
 Chiroptera 59
Chomatodus 535
Chondrenchelys 531
 Chondrichthyes
 Bradyodontia; evolution 521
 dental histology; *Edestus* 441
 swimming; tail function 84
Chondrites 543
 Classification
 chondrichthyes 521
 phylogenetic basis 175
Clidastes 244
 liodontus 250
 propython 248
Cochliodus
 contortus 524
 nibilis 527
Coleura
 gallarum 72
 afra 72
Colombitherium 397
 tolimense 405
Compressidens 236
Conchodus 32
Conchopoma 31, 390
 arctata 34
 edesi 34
 gadiformis 36
 concretions
 fauna 95, 375, 471, 489
 formation on Cephalopoda 513
 phosphatic 545
 pyritic 545
 pyritic cone-in-cone 125
 rate of formation 179
 sideritic 543
 Condylarth
 brains 323
 Cone-in-cone 125
 calcitic 129, 186
 pyrite 125

- Connecticut, Triassic fish 205
 Coprolite 125
 Cretaceous
 Craie d'Obourg 241
 Marlbrook Marl 241
 mosasaur 235
 Niobrara Fm. 371
 Pierre shale 235
 Selma Chalk 240
 Sharon Springs Mem. 235
 Smoky Hill Chalk 371
 Taylor Fm. 241, 355
 Crocodiles des marnières
 d'Argenton 294
Crocodylus 301
 acutus 302
 niloticus 302
 porosus 302
 rollinati 295
 vorax 294
 ziphodon 292
 Crustacea
 burrows 271
 Callianassa 288
 peracarid 95
Cryptocaris hootchi 100
Ctenocephalichthys 366
Ctenodus 32
 cristatus 376
Ctenoptychius 535
 Czechoslovakia, Pennsylvanian
 plants 316

Dadoxylon 180
dakotensis, *Globidens*, n. sp. 240
Daphoenus 330
Deirochelys 173
Deltodus sublaevis 527
Deltoptychius armigerus 524
 Dentition (see also teeth)
 chimaeroid 528
 dipnoans 33, 386
 edestids 532
 holocephalian 524
 iniopterygian 531
 petalodont 535
Desmiodus 532
 Devonian
 Anaspida 83
 chondrichthyan 528
 crustacean radiation 31
 Dipnoi 31
 Dictyodora 543
 Didolodus 410
 Diplomystus 264
 Diplurus 227
 longicaudatus 228
 Dipnoi
 aestivation burrows 271
 Conchopoma 31, 390
 Ctenodus 32, 376
 Esconichthys 395
 Gnathorhiza 32, 271, 393
 Megapleuron zangerli 375
 Monongahela 32, 393
 Neoceratodus 33, 389
 Peplorhina 391
 Phaneropleuron 32, 377
 Protopterus 279
 Sagenodus 32, 375
 Scaumenacia 32, 377
 Straitonia 32, 393
 tooth structure and evolution 31
 Tranodis 32, 377
 Uronemus 31, 393
 Dipnorhynchus
 lehmanni 32
 sussmilchi 32, 55
 Dipterus
 fleischeri 41
 mordax 32
 tuberculatus 43
 valenciennesi 32
 verneuilli 43
 Dissorophoidea 11
 Dissorophus multicinctus 26
 Doleserpeton annectens 12

 Ear, inner, Chiroptera 59
Ecolsonia 13
Ectenosaurus 248
Edaphodon sp. 524
 Edestiformes
 morphology 532
 tooth histology 441
Edestus
 heinrichii 441
 minor 446
 mirus 467

- Elasmobranchii
 teeth 441
Ellobius cf. *fuscocapillus* 145
Emballonura
 E. meeki 72
 E. monticola 72
 E. nigrescens 72
 E. semicaudata 72
Enchodus 371
 England, Jurassic fish 207
 Environmental restriction of faunas
 197
Equus hemionus 145
Eryops 25
Esconichthys apopyris 395
Esconites, n. gen. 472
 zelus, n. sp. 472
Esox lucius 467
 Essex fauna
 Agnatha 489
 Crustacea 95
 Dipnoi 375
 habitat 489
 Polychaeta 471
Eunice 480
Eunicites 485
 avitus 487
 Evolution
 Amphibia, Labrinthodontia 11
 Chelonia 157
 Chondrichthyes 521
 Crustacea 95
 models, functional morphological
 339
 Pisces, Dipnoi 31
 Faunas, environmental restriction
 197
 Finfold, Anaspida 83
Fleurantia 31
 denticulata 36
 France
 Jurassic fish 207
 Permian lungfish 378
 Functional morphology
 Amphibia, Labyrinthodontia 11
 Anaspida 83
 models, evolutionary 339
Ganorhynchus
 splendens 32
 woodwardi 32
garretti, *Omosoma*, n. sp. 356
Geochelone 173
 Geochronology
 Tertiary 193
 Wood Committee 198
Geoemyda 172
 Germany, Jurassic fish 207
Gilpichthys, n. gen. 497
 greenei, n. sp. 497
Globidens 235
 aegyptiacus 239
 alabamensis 237
 dakotensis 242
 stromeri 240
 timorensis 240
Gnathorhiza 32, 271
 dikeloda 51
 serrata 51, 393
greenei, *Gilpichthys*, n. sp. 497
Griphodon 397
 peruvianus 421
Griphognathus 32
 minutidens 36
Grossipterus 32
Halisaurus sternbergi 248
Helicoprion 446, 523
Helodus 526
Hesperornis sp. 236
Hesperorthis laurentia 9
Hesslerella shermani 95
 Heterocercal tail, function 83
Heterodontus 88
Hindia cf. *fibrosa* 1
Hipposideros
 armiger 67
 bouziguensis 65
 caffer 67
 cervinus 67
 cineraceus 67
 commersoni 65
 commersoni merungensis 67
 diadema 67
 diadema griseus 65
 diadema vicareus 67
 larvatus 67

- Histology, dental
 Dipnoi 38
 Elasmobranchii 450
Holmesella 539
Holocentropsis 366
Holocephali 521
Holodipterus 32
 sanctacrucensis 35
Homalodotherium 416
Homo
 africanus 424
 erectus 424
Homonotichthys 360
Howellitubus whitfieldorum 472
Humbertia angustidens 326
Hyaena sp. 145
Hyaenodon horridus 326
Hyopsodus 323
 Hypocercal tail, function 83
Hyrachyus modestus 326

 Illinois, Pennsylvanian
 Agnatha 489
 concretions 125
 Crustacea 95
 Dipnoi 375
 larval chordate 395
 Polychaeta 471
 sedimentary structure 541
 Indiana, Pennsylvanian
 concretions 125, 179
 sharks 442
Iniopterygii 524
Inoceramus 355
 platinus 357
 Iran
 Damghan 150
 Warwasi 143
 Iraq
 Palagawra cave 143
Isopodites 120
 Italy, Triassic fish 207

Jarvikia 32
 Jurassic fish 207

 Kansas, fossil fish 355
Kansius 355
 sternbergi 362

Kinyxys 173
Knighthia 260

 Labrinthodontia 11
Lepidosiren 51
Leptacodon (recte Leptecodon) 371
Lepus cf. *capensis* 145
Limnosaurus ziphodon 292
Lissocoelia 9
Listracanthus 527
Longiscitula houghae 12
Lophodus 532
Lysorophus 271
 tricarínatus 274

Macrocephalochelys 157
 pontica 165
Macroclmys
 "Gypochelys" 158
 temmincki 165
 Mammalia
 Chiroptera, Tertiary 59
 condylarth brains, Tertiary 323
 fauna, early Recent 141
 fauna, Washakie Fm. 569
 Hominoidea 423
 Notoungulata, Tertiary 397
 Mapping
 problems of, Washakie Basin 572
Mayomyzon 489
 Mazon Creek fauna
 Agnatha 489
 Crustacea 95
 Dipnoi 375
 larval chordate 395
 Polychaete 471
 Mecca fauna, edestid 441
 Mecca Quarry Shale 131, 183, 442
Megapleuron
 rochei 375
 zangerli, n. sp. 375
Melanognathus 32
Menaspis armata 524
Meniscotherium 323
Meriones cf. *persicus* 145
Merychippus 201
Mesocricetus cf. *auratus* 145
Mesomphisopus capensis 120

- Mesonyx* 323
obtusidens 324
 Michigan, Pennsylvanian lungfish
 burrows 272
Microtus cf. *socialis* 145
Mioplosus 265
 Mississippi, Cretaceous
 mosasaur 240
 Mississippian
 Bear Gulch Limestone 521
 chondrichthyans 521
 Crustacea 117
 Fayetteville Fm. 511
 Imo Fm. 513
 lungfish 393
 lungfish burrows 272
 Rayonnoceras 511
 Missouri, fossil plants 316
Molgophis 276
Molossus obscurus 78
Monongahela 32, 393
 dunkardesii 33
 Montana, Bear Gulch
 chondrichthyans 521
Mormopterus 74
 kalinoskii 78
 Morphology
 Australopithecine 423
 brains, condylarth, ungulate,
 carnivore 323
 Brittsia problematica 315
 Cretaceous fish 355
 functional (see Functional
 Morphology)
 Globidens 239
 inner Ear, Chiroptera 59
 Pennsylvanian dipnoi 375
 Ptycholepis 205
 shell, turtle 168
 skull, turtle 157
 symphyseal teeth, *Edestus* 441
 teeth, Dipnoi 31
 ziphodont crocodilians 291
Mosasaurus 245
 Mousterian 141
Moythomasia 223
Myotis
 albescens 76
 capaccini 73
 chiloensis 76
 gracilis 76
 mystacinus 76
 ricketi 76
 siligorensis 76
Myriacanthus paradoxus 524
Myripristis 365

Natalus
 mexicanus 76
 stramineus 76
Nautilus 61
Nebalia bentzi 119
Neoceratodus 33, 389
 forsteri 47
Nesodon 413
Nevadocoelia 9
 New Jersey, Triassic fish 205
 New Mexico, Permian lungfish
 burrows 272
Nielsenia 32
 North American Provincial
 Ages 194
Notocaris 122
 Notochord, fossilized 500
Notostylops fauna 409
 Notoungulata 397
Nycterobius 59
 gracilis 64
Nyctiellus lepidus 76
Nyctinomus 59
 stehlini 64

Ochotona cf. *rufescens* 145
Oervigia 32
 Oklahoma, Permian lungfish
 burrows 272
Olenellus zone 201
Omosoma 356
 costa 356
 garreti 356
 monasteri 360
 pulchellum 360
 simum 360
 sahelalmai 357
Ophiumorpha 288
Ophthalmipseudes
 rhenanus 104
 Ordovician, sponges, Quebec 1
Orodus 532

- Ornithoprion* 524
hertwigi 451
 Osteology
 Amphibia, Labrinthodontia 11
 Mammalia, Chiroptera 59
 Mammalia, Australopithecine 423
Ovis orientalis 145
Ozarkocoelia 9

Palaedaphus 32
Palaecaris 95
Palaecrangan problematicus 100
Paleophreatoicus sojanensis 100
Palaephyllophora 59
 oltina 64, 69, 70
 quercyi 69
 St. Nebulae 69
 Palegawra Cave, Iraq 143
Parahippus 201
Paraliodesmus 371
Paraphyllophora 59
 indeterm 64
 robusta 64
Parapyrotherium planum 411
Paraselachii 531
Paulocaris 122
 Pennsylvanian
 agnathans 489
 Brazil Fm. 316
 Carbondale Fm. 541
 Cherokee Group 316
 concretions 125, 179
 crustaceans 95
 edestids 441, 532
 elasmobranch 442, 532
 Excello Shale 128
 ferns 315
 Francis Creek Shale 381, 471, 492, 542
 iniopterygians 532
 Jordan Coal 316
 lungfish 375
 lungfish burrows 272
 Mecca Quarry Shale 131, 183, 442, 542
 Oak Grove Limestone 542
 Pleasantview Sandstone 542
 polychaete 471
 Purington Shale 542
 Radnice Beds 316
 sedimentary structures 541
 Summum Coal 542
 Summum Underclay 542
 Velpen Limestone 135
Pentlandia 32
Peplorhina anthracina 391
Periptychus 323
 Permian
 Admiral Fm. 15
 Amphibia 11
 Arroyo Fm. 271
 Beds of Igornay 379
 Choza Fm. 271
 Clear Fork Group 272
 Crustacea 118
 Dipnoi 377
 Dunkard Series 272
 edestids 532
 Hennessey Group 272
 Sangre de Cristo Fm. 272
 Vale Fm. 271
 Wellington Fm. 272
 Permo-Carboniferous, lungfish
 burrows 271
 Permo-Triassic
 Crustacea 119
 helicoprionids 532
Peronedon 283
Petalodus 535
Petromyzon 496
Phacellopegma 9
Phaneropleuron 32, 377
Pharyngolepis
 heintzi 91
 oblongus 85
Phenacodus 323
Physonemus 527
Pipiscius, n. gen. 490
 zangerli, n. sp. 490
Planolites 543
Platycarpus somenensis 236
 sp. 236
Platxystrodus sp. 524
Platysternon 157
 megacephalum 165
Plegmolepis 224
Plesianthropus 438
Plesiotylosaurus 245
Pleuraspidotherium 323
Pleurolax 526

- Pleurostylodon* 413
Plotosaurus 245
Poecilodus jonesi 527
Polychaeta 471
Porifera 1
 Preservation
 australopithecine bones 423
 elasmobranch teeth 442
 fishes 275, 355
 lysorophid 280
 Mississippian cephalopod 511
 soft-bodied fauna 471
 wood 179
Priscacara 260
Pristichampsus 295
 rollinati 295
 vorax 291
Pristodus 535
Proceratodus 32
Prognathodon overtoni 243
Propyrotherium 409
Protacrodus 534
Protamphisopus
 reichelti 100
 wianamatensis 98
Proticia, n. gen. 397
 venezuelensis, n. sp. 397
Protochelydra 157
 zangerli 164
Protopirata heinrichii 446
Protopterus 33, 279
 aethiopicus 49
 dolloi 49
 Provincial ages 194
Psephodus minutus 529
Pseudorhinolophus 59
 bouziguensis 65
 egerkingensis 65
 morloti 65
 schlosseri 64
 cf. *schlosseri* 64
 sp. 66
 weithoferi 65
Pseudotypotherium 413
Pteraspis 84
Ptycholepis 205
 avus 225
 barboi 223
 bollensis 218
 curta 218
 gracilis 226
 marshi 205
 minor 225
 monilifer 225
Pycnodonte 372
Pycnosterinx 360
Pygmy 425
Pyrite
 association with fossils 445, 513
 replacement 125
Pyrotherium 397
 crassidens 411
 giganteum 411
 pluteum 411
 romeri 411
 trilophodon 411
 Quebec, Ordovician sponges 1
Rayonnoceras solidiforme 511
Ricardowenia mysteriosa 411
 Radiometric dates 193
 Rate of concretion formation 188
Rauffella cf. *filosa* 1
 Recent mammalian fauna, Iran 142
Rhinodipterus 32
Rhinolophus 60
 antiquus 65
Rhynchodipterus 32
Rhynchonycteris naso 72
Rodiotherium armatum 411
Rusophycus 543
Saccopteryx
 bilineata 72
 canescens 72
 leptura 72
Sagenodus 32, 375
 rochei 379
Salicornea 561
Scaumenacia 32, 277
 curta 43
 ohioensis 391
 serratus 391
Schizopteris pinnata 320
Scylorhinus canicula 462
 Sedimentation
 Eocene 263
 Mississippian 511
 Pennsylvanian 186, 489, 541

- Semionotus* 206
Serratocentrus 366
Seymouria 25
 baylorensis 26
 Silurian anaspida 83
 Siren 277
Soederberghia 31
 South African australopithecine 423
 South Dakota Cretaceous mosasaur 235
Spelaeogriphus lepidops 117
Sphryna tudes 442
Spirorbis carbonarius 472
Squaloraja polyspondyla 524
Squalus acanthias 462
Stichocentrus 363
Straitonia 32, 393
 Stratigraphic classification 196
 Stratigraphic practice 194
 Stratigraphy
 Eocene, Washakie 573
 general 193
Streptosolen 9
Sunwapta 32
Sus scrofa 145
Synthetodus trisulcatus 524
- Tadarida*
 cynocephala 78
 mexicana 78
 pumila 78
 Taphonomy
 Eocene Fish 257
 Mississippian Cephalopod 511
Taphozous 61
 liponycteris 72
 liponycteris nudiventris 74
 melanopogon 72
 perforatus 72
Tatera cf. indica 145
 Teeth (see also dentition)
 crocodilians 291
 Dipnoi 31
 elasmobranch 441, 523
 Mammalia 146, 403
 mosasaur 235
 Polychaeta 473
Terrapene 172
Tersomius texensis 15
- Tertiary
 Adobe Town Memb. 574
 Bishop Cgl. 572
 Bridger B 325
 Bridgerian 574
 Browns Beds Series 422
 Browns Park Fm. 571
 Castillo Fm. 401
 Chelonia 163
 Chiroptera 59
 chronology 193
 condylarth brain 323
 Crocodylia 291
 Eocene-Oligocene, Quercy 59
 Eohippus Faunal Zone 196
 Equus Beds 196
 Fort Union Fm. 572
 Green River Shale 257, 571
 "Greensand Fm." 311
 Gualanday Fm. 402
 Kinney Rim Memb. 574
 Matatere Fm. 401
 Misoa 402
 Notoungulata 397
 Pauji Fm. 401
 Pisces 257
 Red Beds Series 421
 Santa Rita Fm. 401
 Trujillo Fm. 401
 Uintan 574
 Wasatch Fm. 572
 Wasatchian 574
 Washakie Fm. 291, 569
- Texas
 Cretaceous mosasaur 241
 Permian burrows 272
Tillodon 326
Toxochelys browni 236
Toxodon 413
Toxodontherium 416
Trachichthyoides 366
Tranodis 32, 377
Trematops 13
 milleri 15
 Trematopsidae 11
Trematopsis 13
 Triassic
 Bull Run Shale 208
 Brunswick Fm. 208
 fishes 205

- lungfish burrows 272
Newark Group 205
Shuttle Meadow Fm. 208
Trigodon 416
Tristychius 536
Turtles, chelydrid
 shell characters 157
 skull characters 157
Typology 193, 292

Uranolophus 32
 wyomingensis 34
Uronemus 31, 393
 splendens 36
Uintan 574

Varanus niloticus 237
Venezuela, Tertiary mammals 397
venezuelensis, *Proticia*, n. sp. 397
Vespertiliavus 59
 bourguignati 64
 gracilis 64
 schlosseri 64
 sp. 73
 wingei 64

Vespertilio
 bourguinatti 69
 morloti 65

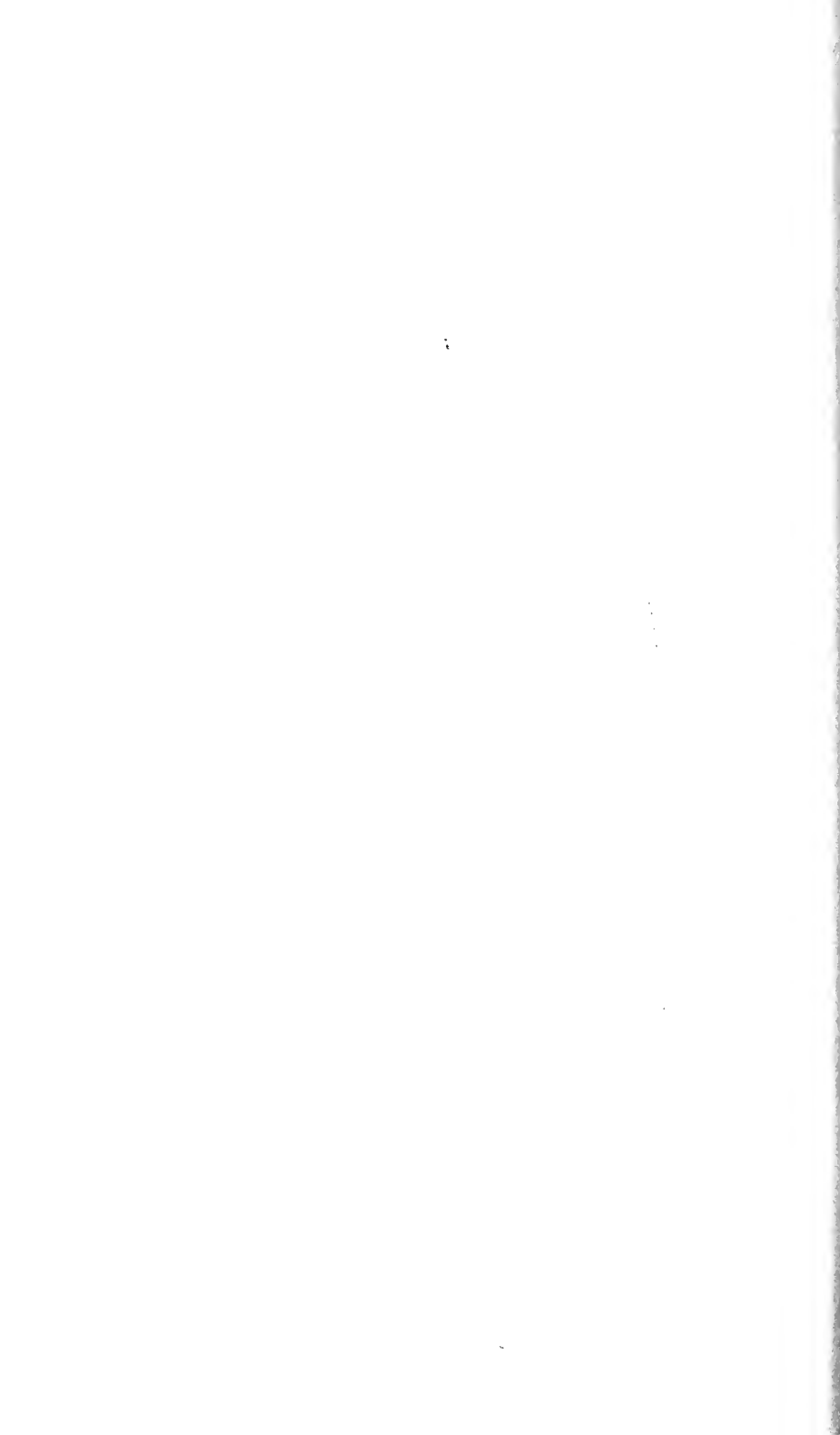
Virginia, Triassic fish 206
Volvicramus grandis 371

Warwasi Rock Shelter, Iran 141
Wasatchian 574
Weigeltisuchus 291
 geiseltalensis 295
Wyoming
 Eocene condylarth brains 323
 Eocene crocodilians 291
 Eocene fish 257
 Eocene mammals 569

Zangerl, Rainer
 cited 160, 188, 236, 291, 340, 450,
 451, 522, 532, 534, 537, 589, 584
 _____ and E.S. Richardson
 cited 129, 349, 443, 555, 560
 _____, B.G. Woodland, E.S.
 Richardson, and D. Zachry
 cited 512, 516, 517
 _____ and G.R. Case
 cited 522, 526, 532
zangerli, n. sp.
 Megapleuron 375
 Pipiscius 490
Zarbian 141
zelus, *Esconites*, n. sp. 472
Zoophycos 543
Zygopteris 320

ERRATA

- p. 64, *Vespertiliavus* should be on the same line as *bourguignati*.
- p. 126, line 7 from bottom, for "is," read "are."
- p. 371, for *Leptacodon*, read *Leptecodon*.
- p. 535, for *Janessa*, read *Janassa*.
- p. 543, for "confolute," read "convolute."
- p. 577, for "robbin's," read "robin's."
- p. 595, line 7, for "Sec. 7," read "Sec. 27."



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